

Remarks:

This amendment is submitted in an earnest effort to advance this case to issue without delay.

The claims have been replaced with a new set of claims 45 - 61. Independent claim 45, which is the only independent claim in the case, corresponds to canceled claim 16 with two significant changes:

1. Instead of reciting "without substantial pretreatment," the exact words of the original disclosure are used in that the claim specifies instead "without precrystallization or predrying." See the paragraph bridging claims 3 and 4.
2. The subject matter of now canceled claim 19 has been inserted in the main claim, namely that the extruder-screw flights are only filled 25% to 60%.

The main problem according to the invention is to make a product from waste PET. The method of this invention has the significant advantage that it can do this without having to subject the starting product, that is the waste PET, to a costly pretreatment of precrystallization and predrying, and this is now clearly recited in the main claim.

The combination of the 25-60% filling of the extruder and the degassing right in the extruder ensures a drying of the starting product, making it possible to use untreated waste PET and still create a quality product in a continuous and highly efficient process.

What is more the filtering and backflushing of the filter ensures that any impurities introduced with the waste are kept out of the final product, and in a manner not significantly effecting the continuous nature of the production process according to the invention.

It took six different references combined in four groups to form a rejection of the claims -- not including claim 19 -- prior to amendment, and a seventh reference was needed to form a rejection of claim 19.

US 6,409,949 of Tanaka relates to a method of thickening polyester resins in an extruder. To this end they are driven by degassing them in a section of the extruder and then the molecule size is increased in a downstream section to increase its viscosity. Nothing in Tanaka suggests partially filling the extruder, and in fact this would be impossible because it would make it impossible to have lower pressure in one part of the extruder than in another. Tanaka produces pellets, not the strip of this invention. Clearly this reference alone is barely relevant to the instant invention.

US 2,823,421 of Scarlett relates to a method of stretching a PET film in two orthogonal directions in its plane. The PET melt is made into a film by extruding it through a slot onto a cooling drum, and then the film is passed over rollers to stretch it. Clamps engage the edge of the film to stretch it transversely. There is no partial filling the extruder-screw flights, no filter, no backflushing, no pressure sensing and control, and practically nothing in Scarlett relevant to the instant invention except the idea of making a PE strip. The recycling of PET is not part of the Scarlett disclosure.

US 6,153,093 of Bentivoglio actually discloses a filter connected to an extruder to sieve the stream issuing from the extruder. A sort of backflushing system is used that uses a pulsed pressure reversal to clear particles off the upstream face of the filter using filtered melt. Nothing, however, suggests controlling the feed or rotation rate upstream in accordance with the pressure measurements used to control the backflushing here. With Bentivoglio the backflushing is simply done periodically, presumably at a rate that is fast enough to keep the filter clean with very dirty PET, but that is much more often than needed with cleaner recycled waste. There is no discussion in Bentivoglio of a chain lengthener, or a packaging web. The timer-controlled system here is a far cry from the inventive system that responds to current operational parameters.

The literature reference of Rosato merely relates to various generic procedures of extruding plastic, including a system usable with dirty starting material. Backflushing is generically mentioned, but not with the pressure monitoring and control of the instant invention. Rosato is largely cumulative to Bentivoglio and offers no teaching beyond those of Bentivoglio.

US 5,176,861 of Ishikawa is more relevant in that this reference describes a method making a film from recycled PET. The starting material is fed in undried condition to an extruder that uses a vacuum to dry it. The melted PET is made into a film and fed to a stretcher. There is no mention of a packaging web, as specifically claimed in this application, nor is there any suggestion to add a chain lengthener at the extruder. There is also no filter with upstream and downstream pressure sensors capable of determining when the filter is getting clogged so that it can be backflushed. All Ishikawa discloses is the production of a low-viscosity polyester melt to make a film, whose flexibility and strength are such that the film would be unusable as a packaging web. Ishikawa is silent as to what to do with any dirt in the PET waste.

US 4,849,113 of Hills, describes a filter having two parallel strip filters that are each traversed by a hot polymer stream. pressure sensors are provided upstream and downstream of the filters to detect blockages. When one of the filters is determined to be blocked, flow through it is reduced to let the

filter pull off a downstream support so that a new strip of filter material can be moved into position. There is nothing resembling backflushing; indeed this system is complexly built to make such backflushing unnecessary. This reference also does not mention a packaging web or a chain lengthener. Instead Hills relates to the manufacture of pellets where flexibility and strength are largely irrelevant. Nothing here suggests partly filling the flights of an extruder screw.

Finally, US 6,583,261 of Bandera relates to the extrusion of PET, in particular waste PET, to make bottles. Here the starting PET particles are dried for about 6 hours at 160°C and then fed to an extruder, a step specifically excluded by claim 45. Any remaining water in the plastic is boiled off in the extruder and sucked out of the extruder. This reference teaches using a weak vacuum to prevent freeing the PET material from the extruder flights. Thus Bandera teaches away from the instant invention. The predrying ensures a highly humid atmosphere in the extruder, which excludes the degassing step of this invention as defined in claim 45. What is more, all this water will reduce the viscosity of the melt in the extruder, as splitting of the ester bridges in the PET chains is facilitated by the high temperatures in the extruder chamber and the presence of residual water. Only use of large quantities of a chain-lengthening would possible reverse this thinning effect. Bandera thus teaches that the predrying is essential.

It is therefore clear that the rejection is a piecemeal collection of features from a large number of references. Some of the features of the invention, e.g. the partial filling of extruder flights in Bandera, are used in spite of teachings elsewhere in the same reference that exclude the method of this invention. Based on this approach it would be impossible to see an invention in any process unless it used a totally novel step; a process using only known steps in any conceivable combination with any conceivable outcome would otherwise be obvious. This is not the proper way to make a combination rejection.

More specifically Tanaka and Bandera are not combinable because Bandera requires a six-hour drying pretreatment of the PET flakes while Tanaka teaches that such treatment is not needed and should be avoided. Similarly, Bentivoglio and Hills are incompatible because the filters they use are of different constructions and the one cannot be operated like the other. The rejection is far-fetched in its selection of some steps from some references, while ignoring teachings of the same references that teach away from using these steps in systems that the rejection subsequently says it is obvious to use them in. It is comparable to saying that, since all the words in Hamlet come from the dictionary, the play is not original.

For these reasons the seven-part rejection of the claims must fall. Allowance of all claims and passage to Issue are in order.

If only minor problems that could be corrected by means of a telephone conference stand in the way of allowance of this case, the examiner is invited to call the undersigned to make the necessary corrections.

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Enclosure: Request for Continued Examination
Three-month extension